

5 "INSTRUMENT PANEL ADAPTER FOR AIRBAG MOUNT"

TECHNICAL FIELD

The present invention relates generally to airbag systems and housings for airbag systems, and more particularly relates to an adapter for facilitating attachment
10 between an airbag retainer and a vehicle instrument panel.

BACKGROUND OF THE INVENTION

Passenger side inflatable restraint systems have become standard equipment on most motor vehicles. In a typical system, an airbag housing is provided,
15 within which a folded airbag cushion is positioned. A gas generator or inflator is positioned such that it may supply an inflation fluid to an interior of the airbag in the event of a crash or other sudden vehicle deceleration. Various designs are known for mounting the housing within the vehicle. For example, the housing may be mounted to the vehicle cross car beam, and/or to various portions of the instrument panel. Engineers
20 have experimented with various designs for different mounting arrangements; however, a continual challenge has been developing mounting arrangements that are suitable for use in different vehicle models. Similarly, variations among the actual dimensions of vehicles of the same make and model can provide challenges to successfully mounting airbag housings therein during assembly or service.

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BRIEF SUMMARY OF THE INVENTION

In one aspect, the present invention provides an adapter for attaching an airbag retainer to an instrument panel in a vehicle. The adapter preferably includes a molded plastic body having a plurality of integral wall portions adapted to attach with a
30 substantially rectangular airbag retainer, and a substantially planar flange projecting outwardly from the wall portions, the flange being adapted to attach with a vehicle instrument panel. A plurality of apertures are preferably formed along at least one of the wall portions and are adapted to receive hooks projecting from the airbag retainer.

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5 BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view of an airbag housing according to a known design;

Figure 2 is a perspective view of an airbag housing according to a preferred embodiment of the present invention;

10 Figure 3 is an exploded view of an airbag housing according to a preferred embodiment of the present invention.

DETAILED DESCRIPTION

The present invention broadly comprises an adapter for facilitating
15 mounting of a retainer for an inflatable safety restraint device in a motor vehicle. In other, related aspects the invention includes an airbag housing and inflatable restraint system. Referring to Figure 2, there is shown a housing comprising an airbag retainer 10 and adapter 14 according to a preferred embodiment of the present invention. Retainer 10 is preferably constructed from a plurality of panels, two of which are visible in Figure
20 2 and numbered 12a and 12b, attached to form a substantially rectangular receptacle for receipt and storage of an inflatable restraint device. Various mounting members, fasteners, etc. may be attached to, or formed integrally with retainer 10 to facilitate attachment with, for example, the vehicle cross car beam. For example, a mounting member 17 may be positioned on panel 12a, allowing fasteners attached thereto to be
25 engaged with a vehicle cross car beam. The panels comprising retainer 10 are preferably further adapted to facilitate attachment with a gas generator device or inflator. Embodiments are contemplated wherein a plurality of panels, for example two end panels and two side panels, are attached to form a substantially rectangular retainer body. Alternative embodiments are also contemplated wherein the retainer is manufactured
30 from a lesser number of panels, formed integrally from one or more pieces of stock, as well as embodiments wherein the retainer comprises a non-rectangular shape. All the component parts of the present invention are manufactured from known materials and by known processes.

Adapter 14 is preferably injection molded plastic, and includes a plurality
35 of wall portions, preferably forming a discontinuous rectangular shape, as illustrated in

5 Figure 2. Although in the preferred embodiments described herein, adapter 14 is substantially rectangular, alternative embodiments are contemplated wherein adapter is non-rectangular. Most broadly, adapter 14 comprises a first peripheral wall adapted to attach with mounting members in a vehicle, and an attached second peripheral wall that depends from the first peripheral wall and is adapted to attach with an airbag housing or
10 retainer. Adapter 14 preferably comprises a first side wall 14a, two end walls 14b and 14c, and second and third side walls 14d and 14e, substantially opposite first side wall 14a. Adapter 14 is preferably discontinuous about a periphery thereof. As used herein, the term “discontinuous” refers to a gap along one of the sides of the shape, preferably a rectangle, defined by adapter 14. In Figure 2, this gap is denoted “G.” This gap facilitates
15 flexing of adapter 14 to allow engagement with retainer 10, as described herein. Although gap G is shown separating second and third sidewalls 14d and 14e, a similar gap could be positioned along any edge of adapter 14. Further, gap G is not critical at all; rather, adapter 14 could be constructed from a sufficiently flexible plastic that it could be fitted over retainer 10, in spite of being continuous around its periphery. Further still,
20 adapter 14 need not be flexed at all to engage with an airbag retainer. For example, adapter 14 might be formed having dimensions sufficient that the airbag retainer fits inside or outside the periphery of adapter 14 without any necessary flexure of adapter 14.

A substantially planar first peripheral wall or flange 15 preferably projects outwardly from walls 14a-14e, and may include holes 16 for receipt of mounting
25 fasteners or some other means whereby it is attachable with mounting members in a vehicle. Alternative embodiments are contemplated wherein flange 15 projects inwardly relative to walls 14a-e. In a preferred embodiment, bolts, screws, etc. can be used to attach adapter 14 (and the associated retainer) to portions of a vehicle instrument panel. Wall 14a is a first sidewall, and preferably has a height that is substantially constant
30 along a length thereof. Walls 14b and 14c, second and third sidewalls, respectively, preferably have heights that decrease in a direction away from first sidewall 14a. Thus, a plane defined by flange 15 slopes relative to planes defined by walls 14a-e. Walls 14d and 14e preferably have substantially constant heights.

A plurality of apertures 20 are preferably formed along sidewall 14a, and
35 receive mounting hooks 22 preferably projecting from panel 12a. Sidewalls 14d and 14e

5 further are preferably formed having apertures 24 adapted to receive hooks 26 projecting
from another panel 12c of retainer 10. In a preferred embodiment, hooks 22 and 26, and
apertures 20 and 24 are spaced and sized such that adapter 14 can “float” relative to
retainer 10, for example, by forming apertures 24 with widths greater than hooks 22 and
26. By fashioning retainer 10 and adapter 14 such that adapter 14 has this relative float,
10 greater mounting flexibility is possible. For example, there is a degree of variability in
the actual dimensions of the instrument panel and various other vehicle features that are
involved in mounting of retainer 10 and adapter 14, and consequently, there is some
inevitable variation in the optimal positions and dimensions of the various components
among vehicles. Allowing relative movement between adapter 14 and retainer 10 lets
15 one or the other of the respective components accommodate a mounting arrangement that
might otherwise not be possible. A further advantage relating to relative float between
the housing and the mounting apparatus is the increased ease with which the module can
be disengaged from mounts on the underside of the instrument panel.

Turning to Figure 3, there is shown an exploded view of an airbag retainer
20 10 and adapter 14, similar to the components shown in Figure 2. In the Figure 3
embodiment, a metallic plate 18 is shown. Plate 18 is preferably molded integrally
during injection molding of adapter 14, and provides enhanced stiffness for maintaining
structural rigidity during airbag deployment. Thus, plate 18 assists in keeping the
inflatable safety apparatus relatively fixed during deployment.

25 Referring now to Figure 1, there is shown an airbag housing 100 in
accordance with a known design. Housing 100 includes a retainer 110 similar to retainer
10 of the present invention but differs, among other things, in that housing 100 provides a
plurality of mounting panels 119. In a typical known system, mounting panels 119 are
specially manufactured to mount a particular retainer in a vehicle. Due to variation in
30 vehicle designs, the mounting panels 119 must be specially manufactured to
accommodate a particular mounting arrangement.

Utilizing the presently disclosed plastic adapter allows engineers to mold
single piece plastic units for mounting a variety of retainers in a variety of vehicles. The
excess parts and labor of manufacturing a specific mounting assembly for specific
35 vehicles is eliminated. Moreover, various bolt hole patterns can be easily formed in

5 flange 15, allowing the adapter to be easily changed to adapt to various mounting
arrangements, either by altering the molded adapter design itself or by retrofitting
existing adapters. Further still, the shape of the adapter can be varied by molding
adapters having different structures, to conform, for example, with a shape of the
underside of an instrument panel. The plastic adapter/metal retainer configuration can be
10 designed to closely fit around obstructions, complex surfaces, or nearby parts, and
reduces the weight of the assembly by substituting plastic for parts formerly constructed
from metal.

The present description is for illustrative purposes only, and should not be
construed to narrow the breadth of the present invention in any way. Thus, those skilled
15 in the art will appreciate that various modifications might be made to the presently
disclosed embodiments without departing from the scope and spirit of the present
invention in any way. Other aspects, features and advantages of the present invention
will be apparent upon an examination of the attached drawing Figures and appended
claims.